PORTLAND HARBOR RI/FS

APPENDIX H
RESIDUAL RISK EVALUATION
PORTLAND HARBOR FEASIBILITY STUDY

DRAFT FINAL

August 18, 2015

Estimate of Post-Remediation Sediment Concentrations:

For the purposes of evaluating long term effectiveness and permanence and overall protection of human health and the environment in the feasibility study, estimates of post remediation sediment concentrations are required. Technology assignments used to develop remedial action alternatives include dredging, capping, in-situ treatment, enhanced monitored natural recovery (EMNR) and monitored natural recovery (MNR) alone or in combination. Specific technology assignments used to develop remedial action alternatives are listed below:

- Broadcast GAC (Aquablock or equivalent)
- Engineered cap (3ft)
- Cap with armoring (3ft)
- Reactive armored cap (3ft)
- Reactive cap (3ft)
- Dredge with backfill
- Dredge with engineered cap (3ft)
- Dredge with reactive armored cap (3ft)
- Dredge with reactive cap (3ft)
- Dredge with reactive cap (3ft)
- Dredge with residual layer (1ft)
- Dredge with reactive residual layer (1ft)
- Dredge with reactive residual layer (1ft) and backfill
- Dredge with significantly augmented reactive cap (3ft)
- Dredge with significantly augmented reactive cap (3ft)
- EMNR in Swan Island
- Monitored Natural Recovery
- MNR - No tech assigned
- Previously remediated

Post remediation sediment concentrations were estimated based on the assumption that a 12 inch layer would be placed either as a residual management layer following dredging, as a 12 inch in-situ treatment layer or as a thin layer enhanced monitored natural recovery (EMNR) sand cover. For consistency and ease of developing estimates of future sediment concentrations following remediation, this assumption was used for all technology assignments.

For the development of post remediation sediment concentrations, the FS assumed that the lower two inches of the thin layer sand cover, in-situ treatment cover or post-dredge residual cover is 15% of the surface sediment concentration or the post dredge residual concentration as a result of mixing during placement. Averaging this concentration over the entire 12” thickness of the thin layer sand cover, in-situ treatment cover or post-dredge residual cover results in a surface sediment concentration of 2.5% of the surface sediment concentration.

Development of post remediation sediment concentrations for other technology assignments has significant uncertainties. These include:

- Uncertainty in the dredged residual surface sediment concentration due to uncertainties in the vertical sediment concentration profile;
- Uncertainty in the concentration of backfill material used as post dredging residual layer prior to and following placement;
- Uncertainty in the concentration of the capping material prior to and following placement; and
- Uncertainty in the recontamination potential associated with unremediated sediments adjacent to the remediated area.

As a result of these uncertainties, areas that were remediated using dredging, capping, in-situ treatment, EMNR or some combination of these technologies, the initial COC sediment bed concentration was assumed to be 2.5% of the initial surface sediment concentration based on existing site data. No reduction in surface sediment concentration was assumed for unremediated areas.

Post remediation sediment concentration estimates were developed on a surface weighted average concentration (SWAC) basis. The SWAC was estimated on a RAO basis. The RAO determined the spatial scale over which the SWAC was estimated as summarized below:

- RAO 1 - Direct Contact Human Health: Risk reduction was evaluated on a one-mile exposure scale based on rolling river miles (e.g., RM 3.1 – 4.1, RM 3.2 – 4.2, RM 3.3 – 4.3, etc.) for both the east and west nearshore areas along with Swan Island Lagoon.

- RAO 2 – Fish Consumption Human Health: Risk reduction was evaluated on a one-mile exposure scale based on rolling river miles (e.g., RM 3.1 – 4.1, RM 3.2 – 4.2, RM 3.3 – 4.3, etc.) for the east, west, and navigation channel along with Swan Island Lagoon.

- RAO 5 – Direct Contact Ecological Receptors: Risk reduction was evaluated on a 0.2 mile exposure scale based on rolling river miles (e.g., RM 3.2 – 3.4, RM 3.3 – 3.5, RM 3.4 – 3.6, etc.) for the east, west, and navigation channel along with Swan Island Lagoon.

- RAO 6 – Prey Consumption Ecological Receptors: Risk reduction was evaluated on a one-mile exposure scale based on rolling river miles (e.g., RM 3.1 – 4.1, RM 3.2 – 4.2, RM 3.3 – 4.3, etc.) for the east, west, and navigation channel along with Swan Island Lagoon.

In addition to rolling river mile averages for the east side of the river, the west side of the river, the navigation channel and Swan Island Lagoon, risk reduction was also evaluated on a site wide exposure scale. Results of the risk reduction evaluation are presented in Section XX and Appendix YY.